

D. NATURAL RESOURCES

The natural resources in Calais contribute to the community's attractiveness as a place to work and to live. They include water resources, such as the St. Croix River and Nashs Lake, open spaces, and forest land; wildlife and fisheries; wetlands; and scenic resources.

LOCATION, TOPOGRAPHY AND GEOLOGY

The city of Calais consists of approximately 23,699 acres or 37.03 square miles. Calais has a rolling topography with several mountains and numerous water bodies. The four highest points in Calais are Magurrewack Mountain in the northwest portion of the city, Elliott Mountain in the north, Mt. Seeall towards the center of the community, and Howard Lake Mountain in the south.

The topography of the city is a result of events that occurred during the last ice age at a time when ancient oceans extended over parts of the State, and glaciers scraped, scoured, and coated other areas with glacial tills, sands, and clay. Calais is characterized by till, thin drift, and glaciomarine deposits. Till, which makes up about 40 percent of the city, is a heterogeneous mixture of sand, silt, clay, and stones including many boulders deposited directly by glacial ice. The topography in these areas is generally a blanket deposit that conforms to the underlying bedrock topography. Thin drift, which makes up about 40 percent of the city's land area, consists of bedrock outcrops and/or thin surficial deposits. The topography here reflects the configuration of the bedrock surface, and ranges from smooth undulating hills to knobby terrain and high mountains. The Calais coastline is characterized by glaciomarine deposits. These deposits consist of silt, clay, sand and minor amounts of gravel. Sand is predominant in these areas. The topography is flat to gently sloping except where dissected by modern streams. See Map 4: Topography Steep Slopes and Flood Zones at the end of this section for general contour elevations.

LAND SUITABILITY FOR DEVELOPMENT

Soils

"Soil survey" is a general term for systematic examination of soils in the field and laboratory. It involves describing, classifying, and mapping soil types, and then interpreting their suitability for various uses such as residential, commercial, agricultural and recreational. The Soil Survey Office of the Soil Conservation Service (SCS) located in Machias has analyzed the characteristics, behavior, distinctive properties and appropriate uses of each different soil type. This data can be found on soils maps of each community in Washington County.

Soil Potential for Low Density Development (LDD)

The United States Department of Agriculture (USDA) Soil Conservation Service (SCS) has prepared soil classification maps for each state (STATSGO). The STATSGO classifications in Calais, Hermon-Brayton-Mondadnock (ME027), Lyman-Lamoine-Scantic (ME037), and Lyman-Dixfield-Marlow (ME035) are mapped on Map 5 - STATSGO Soils. This is the only digital soils information available in Washington County. These associations give general information about development potential but are mapped at too coarse a scale for local planning or site specific purposes. Very few areas of Calais or indeed of Maine in general, have large tracts of land that are ideal for residential development. The Natural Resources Conservation Service of the USDA has produced a handbook of Soil Survey Data for Growth Management in Washington County. This publication is available in the Calais city building along with the soils maps prepared by SCS at a scale of 1 inch = 2000 feet. It includes many tables that interpret the suitability of different soils for agricultural production, woodland productivity, erodability and low density development.

This last interpretation – rating of soil potential for low density urban development – is provided in the table below to guide the concentration of development outside of sewerage area in Calais. Under this system soil potentials are referenced to an individual soil within the county that has the fewest limitations to development (depth to water table, bedrock etc.). This reference soil is given a value of 100 points. Costs that are incurred to overcome limitations to development are developed for all other soils. These costs, as well as costs associated with environmental constraints and long term maintenance, are converted to index points that are subtracted from the reference soil. The result is a comparative evaluation of development costs for the soils in the county. The overall range is large with values between 0 and 100. These numerical ratings are separated into Soil Potential Rating Classes of very low to very high. Thus in the table a soil with a Very High rating has very good potential for development.

Table D-1 SOIL SUITABILITY FOR DEVELOPMENT

Map Unit	Soil Name	Septics	Dwellings	Roads	Development
29X	Udorthents-Urban complex				
39M	Wonsqueak and Bucksport Soils, frequently flooded	Very Low	Very Low	Very Low	Very Low
39RC	Naskeag-Abram-Ricker Complex, 0-15% slopes, very stony				
39P	Bucksport and Wonsqueak soils	Very Low	Very Low	Very Low	Very Low
230C-D	Buxton Silt Loam, 8-15%	Medium	Medium	Medium	Medium
231B	Lamoine-Scantic Complex, 0-5%, very stony	Very Low	Medium	Medium	Low
232B	Lamoine-Buxton Complex 0-8%	Very low	Medium	Medium	Low
233A	Scantic Silt Loam	Very Low	Very Low	Very Low	Very Low
235B	Lamoine Silt Loam, 0-6%	Very low	Medium	Medium	Low
236A	Lamoine-Scantic Complex, 0-5%	Very low	Medium	Medium	Low
238C (238D)	Marlow Fine Sandy Loam, 8-15%	Medium	Medium	High	Medium
240B	Elliottsville-Chesuncook Complex, 3-8%	Medium	High	High	High
241B	Chesuncook Silt Loam, 3-8%	High	High	High	High
241C	Chesuncook Silt Loam, 8-15%	Medium	Medium	Medium	Medium
245B	Telos Silt Loam, 3-8%	Very Low	Medium	Medium	Low
262B	Tunbridge-Lyman Complex, 3-8%	Medium	High	High	High

1278012.8+278012.7

Map Unit	Soil Name	Septics	Dwellings	Roads	Development
262C	Tunbridge-Lyman Complex, 8-15%	Medium	Medium	Medium	Medium
263C	Tunbridge-Lyman-Abram Complex, 3-15%, very stony	Medium	Medium	Medium	Medium
271B	Dixfield-Colonel Complex, 3-8%, very stony	High	High	High	High
272B	Dixfield-Colonel, 3-8%	High	High	High	High
272C	Dixfield Fine Sandy Loam, 8-15%	Medium	Medium	Medium	Medium
273B (274B)	Brayton Fine sandy Loan, 0-5%, very stony	Very Low	Very Low	Low	Very Low
324A	Medomak and Wonsqueak Soils, Frequently Flooded	Very Low	Very Low	Very Low	Very Low
329C	Tunbridge-Lamoine-Lyman Complex, 0-15%, very stony	Medium	Medium	Medium	Medium
330B	Lamoine-Tunbridge-Scantic Complex, 0-8%, very stony	Very low	Medium	Medium	Low
331B	Lamoine-Scantic-Colonel Complex, 0-8%, very stony	Very Low	Medium	Medium	Low
332B	Lamoine-Buxton-Scantic Complex, 0-15%	Very low	Medium	Medium	Low
333A	Scantic-Biddeford Association, 0-3%	Very Low	Very Low	Very Low	Very Low
337C	Dixfield-Tunbridge-Colonel Complex, 3-15%, very stony	Medium	Medium	Medium	Medium
338C	Dixfield-Marlow-Tunbridge Complex, 3-15%, very stony	Medium	Medium	Medium	Medium
338D	Marlow-Tunbridge-Dixfield Complex, 8-30%, very stony	Very Low	Low	Medium	Very Low
339C	Dixfield-Marlow Association, 3-15%, very stony	Medium	Medium	Medium	Medium
340B	Telos-Elliottsville-Monarda Complex, 0-8%, very stony	Very Low	Medium	Medium	Low
340C	Chesuncook-Elliottsville-Telos Complex, 3-15%, very stony	Medium	Medium	Medium	Medium
345B	Telos-Chesuncook Complex, 0-8%, very stony	Very Low	Medium	Medium	Low
345C	Chesuncook-Telos Association, 3-15%, very stony	Medium	Medium	Medium	Medium
348B	Monarda-Telos Association, 0-8%, very stony	Very Low	Very Low	Low	Very Low
363C	Lyman-Tunbridge-Abram Complex, 3-15%, very stony	Low	Low	Medium	Low
363E	Lyman- Abram-Tunbridge Complex, 15-60%, very stony	Very Low	Very Low	Low	Very Low
364B	Naskeag-Tunbridge-Lyman Complex, 0-8%, very stony	Very Low	Medium	Medium	Low
366C	Skerry-Becket Association, 3-15%, very stony	Medium	Medium	Medium	Medium
371B	Dixfield-Colonel Complex, 0-8%, very stony	Very Low	Medium	Medium	Low
373B	Brayton-Colonel Association 0-8%, very stony	Very Low	Very Low	Low	Very Low
375B	Brayton-Colonel Association, 0-8%, extremely stony	Very Low	Very Low	Very Low	Very Low
377C	Skerry-Colonel-Tunbridge Complex, 0-15%, very stony	Medium	Medium	Medium	Medium

Source: USDA-NRSC Orono, ME–Soil Survey Data for Growth Management in Washington County, ME, 1997

These maps and data sheets are useful to the city to predict the sequence of development; develop future land use plans and update zoning; indicate areas where streets or sewers may be prohibitively costly; and identify where environmentally sensitive land should be protected. Soil survey maps do not eliminate the need for on-site sampling, testing, and the study of other relevant conditions (for example, pockets of different soils having completely different qualities may be present).

Highly Erodible Soils

The removal of surface vegetation from large areas of land can cause erosion, which is a major contributor of pollution to surface waters. Highly erodible soils have a potential to erode faster than normal. Soil composition affects its susceptibility to erosion but the combined effects of slope length and steepness are the greatest contributing factors when identifying highly erodible soils.

Most development and intensive land use can and should take place on areas with slopes of less than 15 percent (representing an average drop of 15 feet or less in 100 feet horizontal distance). On slopes greater than 15 percent, the costs of roads, foundations and septic, sewer and other utility systems rise rapidly. Map 4: Topography, Steep Slopes and Flood Zones depicts the location of steep slopes in Calais.

FARM AND FOREST LAND

Agriculture is a very limited land use in Calais. There are several parcels of land devoted to commercial agriculture including cranberry and blueberry production and tree farming. There are no parcels of land registered under the Farm and Open Space Law.

Calais' forests are important to its character and economy. The community forests are the predominant land cover and provide a pleasant rural character to the community. Approximately 90 percent of Calais is forested, consisting of a mixture of hardwoods and softwoods. Most of the Calais' forestland is owned by non-industrial landowners.

Table D-2 SUMMARY OF TIMBER HARVEST INFORMATION

Year	Selection Harvest Acres	Shelterwood Harvest Acres	Clearcut Harvest Acres	Total Harvest Acres	Change of Land use Acres	Number of Timber Harvests
1991	238	0	0	238	0	7
1992	265	0	0	265	0	7
1993	501	0	0	501	0	6
1994	820	80	124	1,024	9	11
1995	312	0	30	342	0	7
1996	244	0	48	292	33	10
1997	429	60	15	504	5	13
1998	409	96	58	563	26	11
1999	753	0	22	775	0	9
2000	393	0	13	406	0	9
2001	392	0	5	397	0	6
2002	58	0	10	68	0	5
Totals	4814	236	325	5375	73	101

The amount of forestland in Tree Growth provides an indication of the prevalence of commercial forestry occurring in Calais. The Tree Growth Tax Law allows for the assessment of forestland used primarily for commercial purposes, based on current use rather

than market value as long as the land is managed for timber production and remains as forest. In July 2004, there were 10,502.44 acres, or 141 parcels, listed in Tree Growth.

Approximately 2,669 acres were classified as softwood, 3,487.94 acres were classified as hardwood, and 4,345.50 acres were classified as mixed wood. This translates into an average parcel size of 400 acres. Land classified under the Tree Growth Tax Law constitutes 48 percent of the land area of the City.

Forest management for wildlife that includes timber harvesting is conducted with the Moosehorn National Wildlife Refuge, which consists of 4,524 acres within Calais. Many species of wildlife will only thrive in a young forest. In the past, wildfires periodically rejuvenated the forest. Nowadays, forest management programs on the Refuge serve to take the place of fire. Small clearcuts scattered throughout the forest provide openings and young bushy growth that serve as good and cover for many wildlife species. This management has resulted in dramatic increases in many species including woodcock, grouse, bear, and moose. Timber harvesting also provides local employment and a percentage of receipts from sales is returned to local communities.

The forestry industry in Calais and surrounding areas accounts for a good portion of the city's economy. Domtar in Woodland employs 554 people at one mill and Louisiana Pacific employs another 120 people at another facility. The timber harvesting and related transportation services needed to supply this wood employ about half again as many people as the mills. Many of the people working in the woods and mills live in Calais. There is also a significant underground economy in timber harvesting and tipping for Christmas wreaths, for which employment figures are unavailable.

An inventory of street and shade trees has not been prepared but would be helpful as part of efforts to revitalize downtown and augment recent investments in interpretive signs, welcome areas and street improvements.

WATER RESOURCES

Calais has capacity to be a year-round deepwater port south of Devil's Head and is blessed with an abundance of good quality water resources. There are numerous streams, the St. Croix River and several lakes located within the boundaries of the city. Most are remotely located and very limited with respect to development. Lake access is mainly from unimproved dirt roads. The lakes in Calais have been little publicized or publicly utilized and/or developed. The St. Croix River forms as the City's northern and eastern border. The River is tidal through much of the City, with high tide stretching about 600 feet upstream of the Ferry Point Bridge. A more detailed examination of marine waters and marine resources are considered in the following section.

Watersheds

A watershed is the land area in which runoff from precipitation drains into a body of water. The boundaries of the watersheds in Calais, also known as drainage divides, are shown on Map 6: Water Resources. The portion of the watershed that has the greatest potential to

affect a body of water is its direct watershed, or that part which does not first drain through upstream areas. Anything that can be transported by water will eventually reach and impact the quality of a water body. Development activities, such as house and road construction and timber harvesting, disturb the land that drains to a lake by streams and groundwater; thus these activities can pollute the watershed.

Rivers, Streams and Brooks

There are numerous streams in Calais including Magurrewock Stream, Dead Meadow Stream, Beaver Brook, Interval Brook, Keenes Lake Outlet and East Stream, Beaver Brook, Interval Brook, Keenes Lake Outlet and East Branch. There are also many lakes including Nashs Lake, Keenes Lake, Beaver Lake, Vose Pond, Mud Lake, and Flowed Land Ponds. Howard Lake and Shattuck Lake are co-jurisdictional with Robbinston. There are approximately 16 camps on Keenes Lake, 50 camps on Nashs Lake, 2 camps on Beaver Lake and 13 camps on Howard Lake. There is also a commercial campground located on Keenes Lake. Documented surface water quality information is very limited. Inland surface water quality is high and most are rated by the Inland Fisheries and Wildlife (IFW) as being of high value for fisheries.

To assess what portion of Maine's rivers, streams, and brooks meet the goal of the Clean Water Act; MDEP uses bacteriological, dissolved oxygen, and aquatic life criteria. All river waters are classified into one of four categories: Class AA, A, B, and C. These classifications are defined by legislation, with Class AA being the highest classification with outstanding quality and high levels of protection. Class C, on the other end of the spectrum, is suitable for recreation and fishing yet has higher levels of bacteria and lower levels of oxygen. The designated uses ascribed to Maine's water quality classifications are provided in footnote 1 and the current classifications in Calais are as follows:

¹ 1. Class AA waters. Class AA shall be the highest classification and shall be applied to waters which are outstanding natural resources and which should be preserved because of their ecological, social, scenic or recreational importance.

- A. Class AA waters shall be of such quality that they are suitable for the designated uses of drinking water after disinfection, fishing, recreation in and on the water and navigation and as habitat for fish and other aquatic life. The habitat shall be characterized as free flowing and natural. [1985, c. 698, § 15 (new).]
- B. The aquatic life, dissolved oxygen and bacteria content of Class AA waters shall be as naturally occurs. [1985, c. 698, § 15 (new).]
- C. There may be no direct discharge of pollutants to Class AA waters, except storm water discharges that are in compliance with state and local requirements. [1999, c. 243, §8 (amd).] [1999, c. 243, §8 (amd).]

2. Class A waters. Class A shall be the 2nd highest classification.

- A. Class A waters shall be of such quality that they are suitable for the designated uses of drinking water after disinfection; fishing; recreation in and on the water; industrial process and cooling water supply; hydroelectric power generation, except as prohibited under Title 12, section 403; and navigation; and as habitat for fish and other aquatic life. The habitat shall be characterized as natural. [1985, c. 698, § 15 (new).]
- B. The dissolved oxygen content of Class A waters shall be not less than 7 parts per million or 75% of saturation, whichever is higher. The aquatic life and bacteria content of Class A waters shall be as naturally occurs. [1985, c. 698, § 15 (new).]
- C. Direct discharges to these waters licensed after January 1, 1986, are permitted only if, in addition to satisfying all the requirements of this article, the discharged effluent will be equal to or better than the existing water quality of the receiving waters. Prior to issuing a discharge license, the department shall require the applicant to objectively demonstrate to the department's satisfaction that the discharge is necessary and that there are no other reasonable alternatives available. Discharges into waters of this classification licensed prior to January 1, 1986, are allowed to continue only until practical alternatives exist. There may be no deposits of any material on the banks of these waters in any manner so that transfer of pollutants into the waters is likely. [1989, c. 890, Pt. A, §40 (aff); Pt. B, §62 (amd).] [1989, c. 890, Pt. A, §40 (aff); Pt. B, §62 (amd).]

3. Class B waters. Class B shall be the 3rd highest classification.

- A. Class B waters shall be of such quality that they are suitable for the designated uses of drinking water supply after treatment; fishing; recreation in and on the water; industrial process and cooling water supply; hydroelectric power generation, except as

The St. Croix River main stem from the outlet of Chiputneticook Lakes to its confluence with the Woodland Lake impoundment is Class A; from the Grand Falls Flowage between Route 1 (Princeton and Indian Township) and Black Cat Island is Class B; and the Woodland Lake impoundment and waters from the Woodland Dam to tidewater including all impoundments are Class C. The St. Croix River tributaries are Class B unless otherwise specified; all tributaries entering upstream from the dam at Calais are Class A unless otherwise classified; and Tomah Stream is Class AA.

Shorelands and Floodplains

Shorelands are environmentally important areas because of their relationship to water quality, their value as wildlife habitat and travel, and their function as floodplains. Development and the removal of vegetation in shoreland areas can increase runoff and sedimentation leading to an increase in the amount of nutrients and other pollutants that reach surface water. This can lead to algal blooms and degraded water quality. Steep slopes with highly erodible soils are particularly susceptible to erosion. The Shoreland Zoning Ordinance, with revisions adopted by Calais in 2002 is designed to provide protection to shorelands.

Floodplains serve to accommodate high levels and large volumes of water and to dissipate the force of flow. A floodplain absorbs and stores a large amount of water, later becoming a source of aquifer recharge. Floodplains also serve as wildlife habitats, open space and outdoor recreation without interfering with their emergency overflow capacity. Flooding can cause serious destruction of property and activities that increase paved or impervious surfaces and/or that change the watercourse on floodplains increase the quantity and rate of runoff that can intensify flooding impacts downstream.

prohibited under Title 12, section 403; and navigation; and as habitat for fish and other aquatic life. The habitat shall be characterized as unimpaired. [1985, c. 698, § 15 (new).]

- B. The dissolved oxygen content of Class B waters shall be not less than 7 parts per million or 75% of saturation, whichever is higher, except that for the period from October 1st to May 14th, in order to ensure spawning and egg incubation of indigenous fish species, the 7-day mean dissolved oxygen concentration shall not be less than 9.5 parts per million and the 1-day minimum dissolved oxygen concentration shall not be less than 8.0 parts per million in identified fish spawning areas. Between May 15th and September 30th, the number of *Escherichia coli* bacteria of human origin in these waters may not exceed a geometric mean of 64 per 100 milliliters or an instantaneous level of 427 per 100 milliliters. [1985, c. 698, § 15 (new).]
- C. Discharges to Class B waters shall not cause adverse impact to aquatic life in that the receiving waters shall be of sufficient quality to support all aquatic species indigenous to the receiving water without detrimental changes in the resident biological community. [1985, c. 698, § 15 (new).] [1985, c. 698, § 15 (new).]

4. Class C waters. Class C shall be the 4th highest classification.

- A. Class C waters shall be of such quality that they are suitable for the designated uses of drinking water supply after treatment; fishing; recreation in and on the water; industrial process and cooling water supply; hydroelectric power generation, except as prohibited under Title 12, section 403; and navigation; and as a habitat for fish and other aquatic life. [1985, c. 698, § 15 (new).]
- B. The dissolved oxygen content of Class C water may be not less than 5 parts per million or 60% of saturation, whichever is higher, except that in identified salmonid spawning areas where water quality is sufficient to ensure spawning, egg incubation and survival of early life stages, that water quality sufficient for these purposes must be maintained. Between May 15th and September 30th, the number of *Escherichia coli* bacteria of human origin in these waters may not exceed a geometric mean of 142 per 100 milliliters or an instantaneous level of 949 per 100 milliliters. The board shall promulgate rules governing the procedure for designation of spawning areas. Those rules must include provision for periodic review of designated spawning areas and consultation with affected persons prior to designation of a stretch of water as a spawning area. [1989, c. 890, Pt. A, §40 (aff); Pt. B, §63 (amd).]
- C. Discharges to Class C waters may cause some changes to aquatic life, provided that the receiving waters shall be of sufficient quality to support all species of fish indigenous to the receiving waters and maintain the structure and function of the resident biological community. [1985, c. 698, § 15 (new).] [1989, c. 890, Pt. A, §40 (aff); Pt. B, §63 (amd).]

The 100-year floodplains within Calais have been identified by the Federal Emergency Management Agency (FEMA) for administration of the Federal Flood Insurance Program. A 100-year flood is a flood that has 1 chance in 100 of being equaled or exceeded in any 1-year period. Local flood plain areas fall into two major categories: areas prone to flooding and velocity zones or areas susceptible to damage from wind-driven water during coastal storms. One hundred year floodplains, shown on Map 4: Topography, Steep Slopes and Flood Zones, are associated with the St. Croix River, Beaver Lake, East Branch, Carson Heath, Beaver Brook, Flowed Land Ponds, Pine Lake, Nashs Lake, Mud Lake, Keenes Lake, Shattuck Lake, Howard Lake, Magurrewock Stream and a number of other wetland areas. Flooding has not been a significant problem in Calais. Calais adopted a Floodplain Management Ordinance in 2000 that includes construction standards to minimize flood damage within the 200-year floodplain.

Wetlands

The term "wetlands" is defined under both state and federal laws as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support prevalence of vegetation typically adapted for life in saturated soils." Wetlands include freshwater swamps, bogs, marshes, heaths, swales, and meadows.

Wetlands are important to the public health, safety and welfare because they act as a filter, absorb excess water, serve as aquifer discharge areas, and provide critical habitats for a wide range of fish and wildlife. They are fragile natural resources. Even building on the edge of a wetland can have significant environmental consequences. Some wetlands have important recreational and educational value providing opportunities for fishing, boating, hunting, and environmental education.

The MDEP has identified wetlands located within Calais, as illustrated on Map 6: Water Resources. These wetlands were identified by aerial photo interpretation and confirmed by soil mapping and other wetland inventories. Field verification of the location and boundaries of the wetlands should be undertaken prior to development. The majority of freshwater wetlands are Class 3 alder swamps, and minor streams, many of which are spring fed, and serve as storm water storage, recharge areas and drainage systems.

Lakes, Phosphorus and Development

The quality of our lakes as recreational resources, gems of natural beauty and coldwater fisheries is a result, at least in part, of their phosphorus content. Phosphorus controls the level of algae² production in lakes. The abundance of algae in the lake water determines the clarity of the water as well as the amount of well oxygenated, cold water available to cold water fish species (trout and salmon) in the summer months. Low phosphorus concentrations yield clear lakes with plenty of deep, cold water oxygen. Higher phosphorus concentrations cause lakes to be cloudy and oxygen may be severely depleted or eliminated from the deep, cold water in

² Algae are microscopic plants, which grow suspended in the open water of the lake or in concentrated clumps around the shallow margins of the lakeshore.

the summer months. Very high concentrations cause dense blooms of blue-green algae, which turn the water a murky green and accumulate in smelly, decaying scums along the shoreline.

Phosphorus is a very common element typically associated with soil and organic matter. It gets into our lakes in a variety of ways. The rainfall that falls directly on the lake has some phosphorus dissolved in it and groundwater may contribute some phosphorus from septic systems around the shoreline. Most of the lake's phosphorus comes from stormwater runoff draining from the lake's watershed to the lake in tributary streams and drainage ways. The amount of phosphorus in the lake depends on what the stormwater runs over on its way to these streams and drainage ways. If the watershed, the land area draining to the lake, is forested, the phosphorus concentration in the lake will be low because the forest is an effective phosphorus sponge, and does not release its phosphorus readily to the stormwater. However, stormwater draining from developed land, whether residential, commercial or industrial, contains a lot of phosphorus. Since the portion of stormwater phosphorus that supports algae growth tends to be associated with small, lightweight soil particles, it is carried very easily and efficiently by stormwater and can be delivered to the lake from anywhere in the watershed. So, generally speaking, the more developed a lake's watershed is, the higher its phosphorus concentration will be.

For lakes with developed or developing watersheds, there are two requirements for keeping phosphorus low and water quality high. First, existing sources of phosphorus to the lake, particularly from soil erosion in the watershed and from inadequate shoreline septic systems on sandy or shallow soils, need to be minimized. The DEP has developed a manual, the Lake Watershed Survey Manual, to guide volunteers in identifying and characterizing watershed phosphorus sources with the assistance of professionals. DEP also has grant programs available to assist in funding these surveys and in fixing the problems identified by the surveys. Second, new additions of phosphorus to the lake that will result from residential and commercial growth in the watershed need to be minimized.

The Maine Department of Environmental Protection (ME-DEP) and the Volunteer Lake Monitoring Program (VLMP) have collaborated in the collection of lake data to evaluate present water quality, track algae blooms, and determine water quality trends. This dataset does not include bacteria, mercury, or nutrients other than phosphorus.

Water quality monitoring data for Nashs Lake is available from 1991-2002. During this period, 2 years of basic chemical information was collected, in addition to Secchi Disk Transparencies (SDT). Nashs Lake is a noncolored lake (average color 16 SPU) with an average SDT of 7.3 m (24ft). The range of water column TP for Nashs Lake is 5-10 parts per billion (ppb) with an average of 8 ppb, while Chla ranges from 2.4-2.5 ppb with an average of 2.5 ppb. Recent dissolved oxygen (DO) profiles show low DO depletion in deep areas of the lake. The potential is low for TP to leave the bottom sediments and become available to algae in the water column (internal loading). Oxygen levels below 5 parts per million stress certain cold water fish, and a persistent loss of oxygen may eliminate or reduce habitat for sensitive cold water species. In summary, the water quality of Nashs Lake is considered to be above average, based on measures of SDT, total phosphorus (TP), and Chlorophyll-a (Chla). The potential for nuisance alga blooms on Nashs Lake is low.

Limited water quality monitoring data is available for two other lakes in Calais but for few parameters and sampling years. Secchi disk transparency data is available for Howard Lake in 1988 and for Keene Lake in 1995. Samples were also taken of late summer temperature and dissolved oxygen on Keene Lake in 1995.

Evaluating New Development Proposals in Lake Watersheds The DEP has developed a method, described in detail in the manual “Phosphorus Control in Lake Watersheds: A Technical Guide for Evaluating New Development”³, to evaluate whether or not a proposed development will add a disproportionate amount of new phosphorus to a lake. It provides a standard which limits the amount of phosphorus that a proposed new development can add to the lake and a means by which the development can be designed and evaluated to insure that it meets the standard for that lake. It principally addresses the long-term increase in stormwater phosphorus that occurs when land is converted from forest or field to residential, commercial or industrial development. Though the standards in this manual will greatly reduce potential long-term impacts on lake water quality, the standards do not totally prevent contributions of phosphorus from new development. Also, since these standards will likely not be applied to all new phosphorus sources in lake’s watershed, their implementation may not, by itself, be sufficient to prevent any noticeable decline in lake water quality. In order to insure that lake water quality is maintained, new development standards should be applied in conjunction with efforts to reduce or eliminate some of the most significant existing sources of phosphorus in the watershed.

Phosphorus Allocations - Table D-3 provides information for all of the lakes that have at least a part of their direct watershed located in Calais. The last column of the table indicates an estimated per acre phosphorus allocation, in pounds of phosphorus per acre per year (lb/acre/yr), for each lake watershed in town. This allocation serves as a standard for evaluating new development proposals. It is applied to the area of the parcel of land being developed to determine how much the development should be allowed to increase phosphorus loading to the lake. For instance, a development proposed on a 100 acre parcel in a lake watershed with a per acre allocation of 0.05 lb/acre/yr would be allowed to increase the annual phosphorus loading to the lake by 5 lb (0.05 X 100). If the projected increase in phosphorus loading to the lake from the development does not exceed this value, then it can safely be concluded that the development will not add an excessive amount of phosphorus to the lake.

³ Phosphorus Control in Lake Watersheds: A Technical Guide for Evaluating New Development - Part A of Chapter 3 in the technical guide describes how the DEP determines phosphorus allocations using the other information included in the spreadsheet. Part B of Chapter 3 describes how to estimate the increase in phosphorus loading to the lake that will result from new subdivision and commercial/industrial type developments. This is the same method that is used to evaluate development applications in lake watersheds that are submitted to DEP under the Site Location Law and the Stormwater Management Law. It is also used by many towns to evaluate applications for new development under their Subdivision and Site Review ordinances. Typically, this analysis is performed by the developer’s consultant, either an engineer, surveyor or soil scientist, though in some it is performed by the developer. DEP can provide assistance to local planning boards in reviewing these submittals as well as to the developer or his/her consultant in performing the analysis.

Table D-3 PER ACRE PHOSPHOROUS ALLOCATIONS FOR CALAIS LAKES

Water Body	Direct Drainage In Calais (acres)	Percent of Drainage In Calais	Area not available for devel't (acres)	Area available for devel't (AAD) (acres)	Growth Factor (GF)	Area likely to be developed (D=GFxAAD) (acres)	Lbs. Phosphorous allocated to towns share of watershed per ppb in lake (F)	Water Quality Category	Level of Protection H=high cold water fishery M=medium	Acceptable increase in lakes phosphorous concentration in ppb (C)	Lbs. Per acre phosphorous allocation (FC/D)
Beaver Lake	511	100	25	486	0.2	97	6.06	Moderate-Sensitive	M	1.00	0.062
Flowed Land Pond	679	100	0	679	0.2	136	10	Moderate-Sensitive	M	1.00	0.074
Howard Lake	647	18 ⁴	35	612	0.25	153	8.18	Moderate-Sensitive	H	0.75	0.04
Keenes Lake	780	100	20	760	0.25	190	8.93	Moderate-Sensitive	H	0.75	0.035
Mud Lake	190	100	0	190	0.2	38	1.34	Moderate-Sensitive	M	1.00	0.035
Nashs Lake	3,694	85 ⁵	200	3494	0.25	874	51.37	Good	H	1.00	0.059
Pennemaquan Lake	143	1 ⁶	0	143	0.2	29	1.52	Moderate-Sensitive	H	0.75	0.04
Pine Lake	145	100	0	145	0.2	29	1.6	Moderate-Sensitive	M	1.00	0.055
Shattuck Lake	42	60 ⁷	2	40	0.25	10	0.66	Moderate-Sensitive	H	0.75	0.05
Unnamed Pond	19	30 ⁸	0	19	0.2	4	0.19	Moderate-Sensitive	M	1.00	0.05
Vose Pond	1,598	100	0	1598	0.2	320	25	Moderate-Sensitive	M	1.00	0.078

The state statute requiring towns to regulate land subdivisions (30-A MRSA §4401) lists phosphorus loading to great ponds as a specific review criteria (#18) that must be addressed before a subdivision permit is issued. The evaluation method described in the technical guide³ provides a means of satisfying this review criteria that takes into consideration the specific sensitivity and limitations of each individual lake and its watershed, as expressed in the lakes per acre phosphorus allocation.

Fishery Resources (Fresh Water)

The Maine Department of Inland Fisheries and Wildlife (IFW) has rated the lakes, ponds, and streams in Calais regarding their value as fisheries habitat. Each water body is rated as to whether it receives cold water or warm water fisheries management. Cold water management supports salmonid species such as salmon and trout, while warm water management supports black bass, chain pickerel, and perch. Some lakes have a combination of both coldwater and warmwater fisheries management.

Nashs Lake, Keenes Lake, Shattuck Lake, and Howard Lake are rated as being high value fishery resources. The Maine Department of Inland Fisheries and Wildlife currently stocks the following waters and species on an annual basis:

Nashs Lake - landlocked salmon

Keenes Lake - brook trout

⁴ located in Baring Plantation; 1.9% of drainage area in Baring Plantation
1.2% of drainage area in Charlotte; 78.6% of drainage area in Robbinston

⁵ 15.1% of drainage area is in Robbinston

⁶ located in Charlotte; 32.2% of drainage area in Baring Plantation; 50.0% of drainage area in Charlotte; 1.5% of drainage area in Meddybemps; 12.6% of drainage area in Pembroke; 2.7% of drainage area in Robbinston

⁷ 40.0% of drainage area is in Robbinston

⁸ located in Baring Plantation; 70.1% of drainage area in Baring Plantation

Shattuck Lake - brook trout

Magurrewock Stream - brook trout

Nashs Lake's major tributary, Interval Brook, is both a spawning and nursery stream for brook trout and salmon and also supports a spawning run of the lake's smelts each spring. Interval Brook is thus rated as being of high value. Magurrewock Stream, an outlet of Howard Lake, is rated as high value.

Beaver Brook, an outlet for Nashs Lake, is rated as moderate value because of its population of native brook trout. The east branch of Magurrewock Stream supports native brook trout and is rated as moderate. There is an unnamed tributary at the western end of Keenes Lake that supports an important smelt spawning run each spring and is rated as having a high fisheries value. Because of its importance the Department has closed it to dipping of smelts by the public along with Interval Brook.

Nashs Lake, Keenes Lake, Howard Lake, Beaver Lake, Vose Lake, and Shattuck Lake are open to fishing and boating. Several of the lakes are not easily accessible. Freshwater fish that are found in Calais include brook trout, landlocked salmon, smallmouth bass, pickerel, white perch, yellow perch, hornpout, and sunfish.

Land use activities that directly affect water quality can significantly alter or destroy the value of these areas for fish. Land clearing or development in the adjacent upland habitat, or “riparian zone”, can also degrade a fishery. Riparian habitat functions to protect water quality and fisheries values by filtering out excessive nutrients, sediments, or other pollutants leaching in from upland areas, by maintaining water temperatures suitable for aquatic life, and by contributing vegetation and invertebrates to the food base.

Groundwater - Sand and Gravel Aquifers

Aquifers may be of two types: bedrock aquifers and sand and gravel aquifers. A bedrock aquifer is adequate for small yields. A sand and gravel aquifer is a deposit of coarse-grained surface materials that, in all probability, can supply large volumes of groundwater. Boundaries are based on the best-known information and encompass areas that tend to be the principal groundwater recharge sites. Recharge to these specific aquifers, however, is likely to occur over a more extensive area than the aquifer itself.

The Maine Geological Survey has identified two sand and gravel aquifers within Calais. These areas have surficial deposits with moderate to good potential groundwater yield, generally between 10 and 50 gallons per minute. The larger area is bound by the St. Croix River on the west, the Magurrewock Stream on the south, Magurrewock Mountain on the east and South Street on the north. The smaller area is bound by the Maine Central Railroad, Route 1 and Magurrewock Stream. Depth to groundwater in these areas averages 6 feet. These aquifers and several public wells in Calais are depicted on Map 6: Water Resources. The Public Water Supply Sources in Calais include:

Table D-4 PUBLIC WATER SUPPLIES

Water System Name	Public Water Supply Type ⁹	Source Name	Source Type	Location
Calais Water Dept	Community	DR. WELL 300' (WELL #1)	Groundwater	Calais
USFW Moosehorn National Wildlife Refuge	Non-Transient	DR WELL 150'	Groundwater	Calais
Keenes Lake Camping Ground	Transient	DR WELL 90'	Groundwater	Calais
Heslins Motel	Non-Transient	DR WELL 98'	Groundwater	Calais
Ice Cream Patch & Take-Out	Transient	DR WELL	Groundwater	Calais
Washington Cnty Tech #1	Non-Transient	DR WELL 160' St. Croix	Groundwater	Calais
Washington Cnty Tech #2	Non-Transient	DR. WELL 180'	Groundwater	Calais
Washington Cnty Tech #3	Non-Transient	Cafeteria 220'	Groundwater	Calais
Washington Cnty Tech #4	Non-Transient	Wood Harv 160'	Groundwater	Calais
Msu 106 Calais High School	Non-Transient	DR. WELL 250'	Groundwater	Calais
Calais Water Dept	Community	DR. WELL 300' (WELL #2)	Groundwater	Calais

Source: Maine Department of Human Services, Bureau of Health, Division of Health Engineering, Drinking Water Program; Jan 3/03

Map 6 can be used to identify surface sites that are unfavorable for storage or disposal of wastes or toxic hazardous materials. It is important to protect groundwater from pollution and depletion. Once groundwater is contaminated, it is difficult, if not impossible, to clean. Contamination can eventually spread from groundwater to surface water and vice versa. Most aquifer and surface water contamination comes from non-point sources including faulty septic systems, road salt leaching into the ground, leaking above ground or underground storage tanks, auto salvage yards, and landfills.

⁹ The Maine Rules Relating to Drinking Water (Chapter 231) define a "public water system" as any publicly or privately owned system of pipes or other constructed conveyances, structures and facilities through which water is obtained for or sold, furnished or distributed to the public for human consumption, if such a system has at least 15 service connections, regularly serves an average of at least 25 individuals daily at least 60 days out of the year or bottles water for sale.

1. Community Water System: A public water system which serves at least fifteen service connections used by year-round residents or regularly serves at least twenty-five year-round residents.

2. Non-Community Water System: A public water system that is not a community water system. There are two types of Non-Community Water Systems. These are:

a. Non-Transient, Non-Community Water Systems: A Non-Community water system that serves at least 25 of the same persons for six months or more per year and may include, but is not limited to, a school, factory, industrial park or office building, and

b. Transient Non-Community Water Systems: A Non-Community water system that serves at least 25 persons, but not necessarily the same persons, for at least 60 days per year and may include, but is not limited to, a highway rest stop, seasonal restaurant, seasonal motel, golf course, park or campground. A bottled water company is a transient, non-community water system.

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Table D-5 RISK ASSESSMENT MATRIX FOR PUBLIC WATER SUPPLIES IN CALAIS

		COMMUNITY WATER SUPPLY									Risk Assessment is based on:
Risk of Contamination due to:	USFW Moosehorn NWR Dr well 150'	Heslins Motel Dr well 98'	Ice Cream Patch and Take out Dr well	Keenes Lake Campground Dr well 90'	Msu106 Calais High School	Wash Cty Community College #1	Wash Cty Community College #2	Wash Cty Community College #3	Wash Cty Community College #4	Calais Water Department ¹⁰	
well type and site geology	Low	Moderate	Moderate	Moderate	Moderate	Low	Moderate	Moderate	Moderate		Well type; Overburden thickness
existing risk of acute contamination	Low	High + coliform test	Moderate Septic system within 300' of well	Low	Moderate Septic system within 300' of well	Moderate Septic system within 300' of well	Moderate Septic system within 300' of well	Moderate Septic system within 300' of well	High + coliform test; Septic system within 300' of well		Coliform test; nitrate test; septic systems within 300' of well
future risk of acute contamination	Low	Low	Low	Moderate Proprietor does not own or control all land within 300'	High Legal control is less than a 150 radius around well	Moderate Proprietor does not own or control all land within 300'	High Legal control is less than a 150 radius around well	High Legal control is less than a 150 radius around well	High Legal control is less than a 150 radius around well		Legal control of 150 foot radius around well; and 300 foot radius of property around the well
existing risk of chronic contamination					Low		Low	Moderate 4 potential sources of contamination incl. underground oil storage tank	Moderate 4 potential sources of contamination incl. underground oil storage tank		Detection of chronic chemical contaminants; # of potential contaminant sources around WHPA ¹¹ ; distance to nearest significant potential source of contamination
future risk of chronic contamination					High		High	High	High		Legal control of entire WHPA; legal control of 2500 Phase II/V waiver radius ¹²

¹⁰ Data Not Available; Source Water Assessment for new Calais Water Department well in the Industrial Park is being conducted in the Spring-Summer of 2005.

¹¹ WHPA – Well Head Protection Area

¹² 2500 Phase II/V waiver radius – with control of land out to 2500 feet the Public Water Supply is waived from performing the full range of Phase II/V water quality tests – a significant savings for the operator.

The city will pursue the extension of public water supplies (from their current terminus at Steamboat St.) a mile south along Route 1 to serve the campus where the Community College and High School are located. Such an extension will address the moderate to high risks of contamination in the wells in that area as well as serve the proposed Pine Tree Zone and other commercial development south of the city center.

Since 1988, all well drillers have been required to submit an information form to the Maine Geological Survey (MGS) on wells drilled to supply potable water. In Calais, MGS has reviewed 32 wells with an average depth of 211 feet. Maximum depth was 420 feet; minimum depth was 90 feet.

The quality of municipal water delivered within the city has been plagued with problems related to odor, test and fixture staining. Please refer to the Public Facilities chapter for a full discussion of city efforts to correct these problems through replacement of old piping, water purification and other means.

There is one sand-salt storage area located within the City off North Street, by the Fire Department. It does not pose a significant threat to ground or surface waters.

MARINE WATERS AND RESOURCES

The City's marine resources are those resources associated with coastal areas along the St. Croix River. The River serves as the eastern and northern boundary of the city of Calais and as an international border between the United States and Canada. Jurisdiction over the quantity of flow and water quality is shared by the U.S. townships and Canadian provinces within the St. Croix Watershed. The watershed drains approximately 1,633 square miles, and encompasses over 19 lake systems. The river flows southeasterly along the international boundary, before discharging into the Atlantic Ocean near Passamaquoddy Bay. The river is considered freshwater to a point approximately 600 feet upstream of the Ferry Point Bridge. Tidal influences are limited from further upstream migration by the numerous rapids and riffles.

The St. Croix River, downstream of the Ferry Point Bridge, serves as the coastal area for the city of Calais. From the Ferry Point Bridge, the river runs approximately 2.1 miles to Todd Point, 7 miles to Oak Bay, and 10.5 miles to the southeast border of Calais. The area between 600 feet upstream of Ferry Point Bridge and Todd Point is classified by the Maine Geological Survey as "Tidal/Fluvial". This section is under tidal influence but does not carry estuarine waters. A transition channel begins at Todd Point and continues for approximately one mile downstream. From this point down to Oak Bay, the area is classified as "Estuarine Channel". In this area, ocean and river water mix producing a salinity level between 0.5 and 30 parts per thousand.

Steep banks accompanied by long sloping mud flats are characteristic of the Calais coastal area between Ferry Point Bridge and Todd Point. Seaward of Todd Point, the coastline is characterized by narrow, rocky shores. Width and depth of the river are greatly affected by

tidal influences. During high tide, the river channel from bank to bank can exceed 2500 feet. The narrowest points, less than 750 feet from bank to bank, occur at Todd Point, The Narrows and The Ledge. The western half of the channel is generally less than 6 feet deep at low tide. Channel depth increases with downstream distance on the eastern half of the channel, from 6 feet to 30 feet deep. South of Devil's Head, the channel widens providing depths of 40 or more -at low tide for deep draft vessels.

Over 75 percent of land use within the watershed is characterized as forestry related. The waterway has been used for over a century by the forestry products industry. Many dams were constructed within the watershed for production of hydroelectric power. Years ago, the lower section of the river was clogged with sawmills and sawdust, while the upper section was being scoured by log drives. Mud flats were formed, in part, through accumulation of sand, gravel and organic materials deposited during the lumber and sawmill operations. In addition, the waters were used for disposal of raw sewage and industrial wastes. These uses contributed to water turbidity, nutrient overloading, the formation of soft river bottoms, and deposition of fine-grained sediments

Marine Water Quality

The Maine Department of Environmental Protection classifies surface waters according to their desired use and water quality necessary to support that use. Water quality in the Calais coastal area is fair, and has significantly improved in the last 10 years. The Maine Department of Environmental Protection (DEP) has classified the Calais region of the St. Croix River as "SC". This rating means that the water quality is satisfactory for fishing, recreational boating and other similar uses. Primary water contact is not recommended. Water quality is characterized by elevated concentrations of suspended solids, bacteria and some ions and metals. Bacterial pollution directly downstream of Calais, measured in fecal coliform concentration, exceeds the legal Maine DEP limits. While fecal coliform concentrations decrease downstream, they are still too high for the direct harvest of major tidal clam beds.

Primary sources of water quality degradation upstream of Calais include the pulp and paper mill in Woodland and sewage effluent from the river communities. Pollution sources from the City of Calais include sewage effluent, storm water runoff and commercial activities. Water quality degradation has significantly decreased since the upgrading of municipal waste-water treatment systems, funded in 1976 by the Federal Clean Water Act. Continuing improvements to the public wastewater treatment systems are being undertaken by the river communities. Two old sewage treatment plants in St. Stephen, NB are now shut down and being decommissioned and a new plant became fully operational in 2004. Ongoing sewer system upgrades by Calais, and progressive sewer/stormwater line system upgrades by Calais and by St. Stephen, are expected to reduce bacterial levels in the river significantly.

Calais has five point source discharges including the sewage treatment plant and four overboard discharge permits. Non-point source pollution poses the greatest threat to water quality in Maine communities and Calais is no exception. The most significant contributing source comes from erosion and sedimentation as well as excessive run-off of nutrients. Additional contributing factors include animal wastes, fertilizers, sand and salt storage, waste

lagoons, faulty septic systems, roadside erosion, leaking underground storage tanks, and hazardous substances.

Fisheries (Marine)

Coastal fishes of primary significance in the Calais area are species that migrate between the St. Croix River and the ocean (Atlantic salmon, alewife, American eel), spend part of their lifecycle in the estuary (striped bass, rainbow smelt), or are permanently resident in the estuary (winter flounder).

Water quality improvements since the early 1970s led to efforts to restore native Atlantic salmon and alewife runs beginning in the early 1980s, with mixed success. An average of 20 adult Atlantic salmon now return to the St. Croix River annually, these the result of a juvenile stocking effort, and alewife numbers have declined from 2.6 million fish in 1987 to less than 1,300 fish in 2004 due to Maine legislation (Sec 1.12 MRSA s6134 passed by the Legislature on April 27, 1995) that has blocked them from much of their spawning habitat since 1995.

Other marine species of significance are the American lobster, sea scallop, spiny sea urchin, softshell clam and clam worm. Lobster and scallop are harvested commercially in the main section of the St. Croix estuary and clam worms are harvested commercially from intertidal mud flats along the length of the estuary. Softshell clam harvest is prohibited due to current bacteria levels.

The economic value of the coastal fisheries is considered fair to poor due to low stock levels and, for shellfish, bacterial pollution. Continued initiatives to reduce pollution levels may lead to an increased fisheries value in the future. Map 7, Marine Resources, depicts the location of Molluscan shellfish habitat, areas closed to shellfish harvest in 2003, anadromous and catadromous fish locations and historic locations of herring weirs.

Shellfish Management

The entire estuary of the St. Croix River is closed to shellfishing and there are limited areas of molluscan shellfish habitat as depicted on Map 7 – Marine Resources.

Commercial Fishing

As the Table D-6 describes, commercial fishing in Calais is of substantially less significance to the local economy than in many Washington County communities.

Table D-6 FISHING PRESENCE IN WASHINGTON COUNTY

Community	State License	Clam License	Total Per town	Clam Data Source
Winter Harbor	55	0	55	CEI Report
Gouldsboro	133	17	150	Town manager
Steuben	138	21	159	Town office
Milbridge	144	70	214	Town manager
Harrington	109	57	166	Jim Layton

Community	State License	Clam License	Total Per town	Clam Data Source
Addison	151	40	191	CEI Report
Jonesport	191	73	264	CEI Report
Beals	191	12	203	From town clerk
Jonesboro	79	44	123	From annual report
Roque Bluffs	41	58	99	From annual report/town clerk
Machias	88	0	88	No flats
East Machias	50	27	77	Town office
Machiasport	150	79	229	CEI Report
Cutler	87	43	130	Town office
Whiting	16	6	22	Town clerk
Trescott Twp.	7	n/a	7	State issues
Edmunds Twp.	8	n/a	8	State issues
Lubec	209	59	268	Town office
Eastport	43	4	47	CEI Report
Pembroke	58	35	93	Harbor master
Perry	39	22	61	Town clerk
Robbinston	8	0	8	Flats are closed
Calais	12	0	12	No requests
Totals	2007	667		

Source: Paths and Piers: A Study of Commercial Fishing Access in Downeast Maine Coastal Communities, Sunrise County Economic Council, April, 2003

However, data from the Department of Marine Resources, shown in Tables D-7 and D-8 indicate the number of residents holding marine resource licenses (dealers and harvesters) has increased slightly in the past five years and the number of commercial lobster tags registered to Calais residents rose until 2001 then declined in 2002 to levels seen in 1998.

Table D-7 MARINE LICENSE HOLDERS IN CALAIS 1998 – 2002

Type	License Year				
	1998	1999	2000	2001	2002
Residents Holding Marine Resource Licenses - Dealers	9	6	8	8	7
Residents Holding Marine Resource Licenses - Harvesters	16	16	16	17	22
Grand Total*	25	22	24	25	29

Source: Maine Department of Marine Resources, 2003

Table D-8 COMMERCIAL LOBSTER TAGS REGISTERED TO CALAIS RESIDENTS

# of Tags							
Lobster		1998	1999	2000	2001	2002	Grand Total*
L-A-1	LC1 – Class 1 commercial lobster license	95	100	140	390	290	1015
	LC2 – Class 2 commercial lobster license		500	500	500		1500
L-A-1 Total*		95	600	640	890	290	2515
L-A-5	LC2 – Class 2 commercial lobster license	600	800	770			2170
	LC3 – Class 3 commercial lobster license				880	800	1680
L-A-5 Total*		600	800	770	880	800	3850
L-B-5	LC2 - Class 2 commercial lobster license	500					500

L-B-5 Total*	500					500
Grand Total*	1195	1400	1410	1770	1090	6865

Source: Maine Department of Marine Resources, 2003

Target species (See Table D-9) appear to be limited to scallop and lobster or crab and the data indicate a few harvesters rely on this activity to supplement seasonal income.

Table D-9 FISHING LICENSES IN CALAIS BY HARVEST SPECIES 1998-2002

Count of License Types/Town	Dealers by Year					Harvesters by Year				
	1998	1999	2000	2001	2002	1998	1999	2000	2001	2002
License Type										
COMMERCIAL FISHING SINGLE OPERATOR						4			2	10
COMMERCIAL FISHING WITH CREW							2	2	2	
COMMERCIAL SHELLFISH									2	
LOBSTER MEAT PERMIT					2					
LOBSTER/CRAB APPRENTICE										2
LOBSTER/CRAB CLASS 1						8	8	8	8	8
LOBSTER/CRAB CLASS 11						4	4	4	2	
LOBSTER/CRAB CLASS 111									2	2
LOBSTER/CRAB NON-COMMERCIAL						4	6	6	8	10
LOBSTER/CRAB OVER AGE 70										
MARINE WORM DIGGING										
MUSSEL-DRAGGER										
RETAIL SEAFOOD	16	12	16	16	12					
SCALLOP-DIVER						4	2	2	2	2
SCALLOP-DRAGGER						2	2	2	2	6
SCALLOP, NON-COMMERCIAL						2	4	4	2	
SEA URCHIN- DIVER						4	4	4	2	2
SEA URCHIN-DRAGGER										2
WHOLESALE SEAFOOD, NO LOBSTERS	2									
WHOLESALE SEAFOOD, WITH LOBSTERS										
GRAND TOTAL*	18	12	16	16	14	32	32	32	34	44

Source: Maine Department of Marine Resources, 2003

The number of fishing boats registered to Calais residents is also indicative of an industry with a steady if slight increase.

Table D-10 FISHING BOATS REGISTERED TO CALAIS RESIDENTS

Count of Boats	Year					
Length	1998	1999	2000	2001	2002	Grand Total*
0			3		1	4
14	2	2		1	2	7
15	1	1				2
16			1	1		2
17			1	1	1	3
18	4	3	1			8
19		1		3	4	8
20			2	2	2	6
22	2	2	1			5
32	3	1				4
34				3	3	6
36	2	3				5
38		2	3	3	4	12

Grand Total	14	15	12	14	17	72
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Source: Maine Department of Marine Resources, 2003

Aquaculture

There are no aquaculture lease sites in Calais.

Access to the Marine Resource

Although there is presently no appreciable shipping traffic into Calais, it was once an active port city. Calais historically served the lumber, granite and fur industries. A navigation channel was constructed by the U.S. Army Corps of Engineers, with initial dredging completed in 1916. The project provided a two mile long 12 foot deep channel followed by a two mile long 9 foot deep channel. The dredged area is located between Calais and Whitlocks Mill, and primarily accounts for the existing channel depth. The regional port for New Brunswick is still active, and attracts several ocean-going ships. The Bayside Marine Terminal is a busy quarry and port located within earshot and directly across the river from Devil's Head. Ship traffic ~~is limited~~ today occurs primarily ~~to~~ downstream of the Oak Bay inlet area, but the ship channel downstream from Devil's Head has sufficient depth and width to accommodate deep draft vessels.

This potential for deepwater port together with ready access to pipeline facilities make Calais an ideal candidate for an LNG facility and other opportunities to take advantage of deepwater port facilities.¹³

Water dependent uses are minimal in the Calais coastal area. Commercial fishermen frequently use the channel for transportation of their goods. Recreational boat traffic is limited on the western portion of the channel. Tidal fluctuations impair docking and mooring accessibility in the downtown section of Calais. Small commercial and recreational boat traffic increases on the eastern portion, particularly around St. Croix Island. Public boat launches are located at Pikes Park, Steamboat Street Point and at the St. Croix International Historic Site. Organized public recreational activities include a "Rubber Ducky Race" and the "Crazy Raft Race", both part of the Annual International Festival. Use of the waterfront is increasing with the development of Waterfront Park, the waterfront walkway and downtown revitalization efforts. As noted in the Public Facilities section the city received a Small Harbor Improvement Project grant to install floating dock facilities.

According to a recent study by the Sunrise County Economic Council, the city of Calais has more than 15.16 miles of coastline and is home to 12 commercial fishermen – see Table D-11. Access to the waterfront in Calais is provided at 2 commercial or private waterfront facilities, neither of which is dedicated to commercial fishing use. These public access points include the city owned ramps at Pikes Point and at Steamboat Point and are depicted on Map 3 – Calais Public Facilities. None of the current access is provided through private-owned piers and wharfs.

¹³ Updated natural resource maps added as Appendix M in support of amendments relative to Marine Industrial Zone (I-3). Additional information in support of these amendments may be found in Appendices N and O 1278012.8+278012.7

Table D-11 CITY OF CALAIS BOAT ACCESS & WATERFRONT FACILITIES DATA

Access and Waterfront Facilities Data	Calais
Miles of Coastline	15.16
Total Commercial resource harvesters	12
Fisheries impacted by loss of access	Clam
Boat Access:	
Total current boat access (moorings+berthing+slips+tie ups) commercial & recreational combined	10
Percent of total current boat access used by commercial fishermen	0%
Facilities:	
Number of commercial private & public waterfront facilities in 2002	2
Number of the commercial private & public waterfront facilities <u>dedicated</u> to commercial fishing use	0
The percent of commercial fishing access that is achieved through private residence (pier/wharfs) that are owned or leased by fishermen.	0%
Number of "Other" access points (beaches, land, property crossing) not actual facilities.	0
The percent Population Change 1990-2000	-5%
The percent Change in Housing 1990-2000	16%
Annual taxes per acre in 2001	\$174.98
Land valuation per acre in 2001	\$2,049.61
Waterfront Issues	
Commercial Fishing access is a problem	No
Current threats to commercial fishing access	Infrastructure Deterioration
The town/city is planning to address commercial fishing access	Yes
The top 3 useful tools to address commercial fishing access were:	Property tax Relief Deeded Access Planning assistance
Commercial Fishing Access Vulnerability Rating	7 (see text following table)

Source: Paths and Piers: A Study of Commercial Fishing Access in Downeast Maine Coastal Communities; January 2003, Sunrise County Economic Council submitted to the State Planning Office and the Maine Coastal Program

The commercial fishing access vulnerability rating in the Paths and Piers study sought to evaluate the vulnerability of losing commercial fishing access within a community. Ratings were derived from a matrix that analyzed the following factors:

- Whether commercial fishing access is a community priority
- Whether or not a community has strong ordinances
- Whether or not a community has a dedicated fishing pier
- Development pressures
- Number of harvesters

Vulnerability ratings ranged from a low of 1 and a high of 7 with communities falling in the 1-3 category having the least vulnerability to a loss of commercial fishing access, those in the 4-5 category having a moderate vulnerability and those in the 5-7 range having the greatest vulnerability to loss of commercial fishing access. Calais, with a rating of 7 is thus highly vulnerable to loss of access without taking measure to correct specific access problems. The analysis in Table D-11 indicates that the city could improve commercial fishing access by

improving infrastructure, providing property tax relief, obtaining planning assistance, and purchasing additional deeded access.

Responses to the public survey in May of 2004 indicated very strong support for the city to develop recreational facilities along the waterfront, and to invest in shore access and restoration and maintenance of the harbor.

CRITICAL NATURAL RESOURCES

Maine Natural Areas Program

The Natural Areas Program is administered by the State Department of Conservation whose job it is to document Rare and Unique Botanical Features. These include the habitat of rare, threatened, or endangered plant species and unique or exemplary natural communities. There is one such rarity in Calais.

Table D-12 RARE OR EXEMPLARY BOTANICAL FEATURES IN CALAIS

Scientific Name (Common Name)	Last Seen	State Rarity	Global Rarity	Legal Status	Habitat Description
SUAEDA MARITIMA SSP. RICHTI (RICH'S SEA-BLITE)	1940 08-01	S1	G5T3	SC	Salt-marshes and sea-stands.
<p>S1 - Critically imperiled in Maine because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the state.</p> <p>S2 - Imperiled in Maine due to rarity (6 - 20 occurrences or few remaining individuals or acres) or other factors making it vulnerable to further decline.</p> <p>S3 - Rare in Maine (on the order of 20-100 occurrences).</p> <p>S4 - Apparently secure in Maine.</p> <p>S5 - Demonstrably secure in Maine</p> <p>G1 - Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.</p> <p>G2 - Globally imperiled due to rarity (6 - 20 occurrences or few remaining individuals or acres) or other factors making it vulnerable to further decline.</p> <p>G3 - Globally rare (on the order of 20 - 100 occurrences).</p> <p>G4 - Apparently secure globally.</p> <p>G5 - Demonstrably secure globally.</p> <p>Note: Global ranks are determined by The Nature Conservancy.</p> <p>T - THREATENED: Rare and, with further decline, could become endangered; or federally listed as Endangered.</p> <p>SC - SPECIAL CONCERN: Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered.</p> <p>SX-Apparently extirpated in Maine (historically occurring species for which habitat no longer exists in Maine).</p> <p>E-ENDANGERED; Rare and in danger of being lost from the state in the foreseeable future, or federally listed as Endangered.</p>					
Source: State of Maine Department of Conservation (10/24/02)					

Wildlife Habitats

Conserving an array of habitats and their associated wildlife species will help in maintaining biological diversity and ensuring that wildlife and human populations remain healthy. To feed and reproduce, wildlife relies on a variety of food, cover, water, and space. Development can result in the deterioration of habitats and diversity through habitat fragmentation and loss of open space and essential travel corridors.

The richest wildlife diversity in Calais is avian. Bald eagles (*Haliaeetus leucocephalus*) are common and nest on the St. Croix River and several inland lakes and rivers. See Map 8 - Critical Habitat.

The Moosehorn National Wildlife Refuge, just southwest of Calais, was established in 1937 as a refuge and breeding ground for migratory birds and other wildlife. It is the first in a

chain of migratory bird refuges that extends from Maine to Florida. The Refuge consists of two units: the Baring Unit covers 16,080 acres and is located off U.S. Route 1 southwest of Calais and the 6,665 acre Edmunds Unit borders the tidal waters of Cobscook Bay near Dennysville.

Approximately, 2,780 acres of the Edmunds Unit and 4,680 acres of the Baring Unit were set aside as Wilderness Areas by Congress. As part of the National Wilderness Preservation System these areas are granted special protection that will insure the preservation of their wilderness characteristics.

The Refuge is a highly glaciated expanse of rolling hills, large ledge outcrops, streams, lakes, bogs, and marshes. A diverse forest of aspen, maple, birch, spruce, and fir dominates the landscape and scattered stands of majestic white pine are common. The American woodcock and Eastern Flyway woodcock is intensely studied and managed at Moosehorn. The endangered bald eagle frequents the Refuge and in several pairs of eagles nest there. The woodlands of Moosehorn also abound with many other species including black bears, white-tailed deer, and moose. The Refuge also serves as an important breeding area and migration stop for a variety of waterfowl and other waterbirds including black ducks, wood ducks, ring-necked ducks, Canada geese, loons and ospreys.

Essential Wildlife Habitats - Essential Wildlife Habitats are defined under the Maine Endangered Species Act as a habitat "currently or historically providing physical or biological features essential to the conservation of an Endangered or Threatened Species in Maine and with may require special management considerations". According to MDIFW, Calais has four sites of essential wildlife habitat that support bald eagles including nesting territory that is occupied by eagles during at least one of the three most recent years and intact for two consecutive years. See Map 8 – Critical Habitat.

Significant Wildlife Habitat - Significant Wildlife Habitat, as defined by Maine's Natural Resources Protection Act (NRPA), is intended to prevent further degradation of certain natural resources of state significance. NRPA-defined Significant Wildlife Habitats in Calais are illustrated on Map 9 - Critical Habitat and includes waterfowl/wading bird habitat.

In addition to the habitats that have been mapped by IF&W and mentioned above, other notable wildlife habitats in Calais include large, undeveloped habitat blocks and riparian habitats, and vernal ponds. Larger undeveloped blocks of forest and wetlands provide habitat for wide-ranging mammals such as bobcat and black bear, as well as for rarely-seen forest birds and a myriad of other wildlife species. Riparian areas offer habitat for many plants and animals and can also serve as wildlife travel corridors, as well as playing an important role in protection water quality, as noted in the plan.

STATE PARKS AND PUBLIC RESERVED LANDS

In Calais there are a total of 2448.28 acres owned for public purposes. Of these, 441.38 are state owned, 391.31 are federally owned, and 1615.59 are owned by the city, made up mostly

of the 640 acres at Nashs Lake and the Devils Head Recreation Area. All are depicted on Map 2 – Calais Public Facilities. City ownership is split among conservation and park lands (Nashs Lake - 640 acres), the industrial park, a various public services and facilities (schools, public safety, cemeteries, water and sewer systems etc.). Additional public accesses, picnic areas and cemeteries are also noted on Maps 2 and 3.

NATURAL RESOURCE PROTECTION

There are a variety of laws and legal incentives that protect the natural resources in Calais. There are also local and regional groups who protect these resources through scientific data gathering and education. Those of greatest significance are summarized below.

Pertinent Federal and State Laws – The federal and state laws that protect the natural resources of Calais include:

- Maine Natural Resources Protection Act (NRPA) – which regulates activities in, on, over or adjacent to natural resources such as lakes, wetlands, streams, rivers, fragile mountain areas, and sand dune systems. Standards focus on the possible impacts to the resources and to existing uses.
- Maine Storm Water Management – regulates activities creating impervious or disturbed areas (of size and location) because of their potential impacts to water quality. In effect, this law extends storm water standards to smaller-than Site Law – sized projects. It requires quantity standards for storm water to be met in some areas, and both quantity and quality standards to be met in others.
- Maine Site Location of Development Law – regulates developments that may have a substantial impact on the environment (i.e., large subdivisions and/or structures, 20 acre plus developments, and metallic mineral mining operations. Standards address a range of environmental impacts.
- Maine Minimum Lot Size Law – regulates subsurface waste disposal through requirements for minimum lot size and minimum frontage on a water body. The minimum lot size requirement for a single- family residence is 20,000 square feet; the shoreland frontage requirement is 150 feet. The requirements for multi-family and other uses are based on the amount of sewage generated.

Pertinent Local Laws - At the local level, Calais has adopted minimum shoreland standards, as required by the State Mandatory Shoreland Zoning Act. Surface waters in Calais are also protected through the Plumbing Code and the local Subdivision Ordinance. Calais has a Floodplain Management Ordinance to protect the marine waterfront by restricting building to reduce flood damage and other problems. Calais last revised its shoreland zoning ordinance in 2002 and conducted a major revision of all land use codes in 1996; the zoning ordinance is now regularly updated.

Pertinent Tax Incentive Programs - A variety of programs provide financial incentives for landowners to keep land undeveloped and managed for long term productivity. They include the following:

- Farm and Open Space Tax Law - (Title 36, MRSA, Section 1101, et seq.) encourages landowners to conserve farmland and open space by taxing the land at a rate based on its current use, rather than potential fair market value.

Currently Calais has no acreage in the farmland program. To be eligible for the farmland program parcels must be at least five contiguous acres, utilized for the production of farming, agriculture or horticulture activities and show gross earnings from agricultural production of at least \$2,000 (which may include the value of commodities produced for consumption by the farm household) during one of the last two years or three of the last five years.

The Open Space portion of this program has no minimum lot size requirements and the tract must be preserved or restricted in use to provide a public benefit by conserving scenic resources, enhancing public recreation opportunities, promoting game management or preserving wildlife habitat.

In 2004, Calais had 0 acres enrolled in this program.

- Tree Growth Tax Law - (Title 36, MRSA, Section 571, et seq.) provides for the valuation of land classified as forestland on the basis of productivity, rather than fair market, value.

According to municipal records for fiscal year 2004, Calais had 141 parcels totaling 10,502.44 acres in tree growth tax status.

These programs enable farmers and other landowners to use their property for its productive use at a property tax rate that reflects farming and open space rather than residential development land valuations. If the property is removed from the program, a penalty is assessed against the property based on the number of years the property was enrolled in the program and/or a percentage of fair market value upon the date of withdrawal.

Local and Regional Conservation and Protection Efforts - The St. Croix International Waterway Commission was established by the State of Maine and Province of New Brunswick to protect and manage the St. Croix River's resources. The Commission completed the "Plan for Long-term Cooperative Management of the St. Croix International Waterway" in 1993 which set forth a cooperative riverway management strategy that involves federal, state and local levels of government, citizens and other groups. The principal management goals of the Commission are as follows:

1. Protect and enhance the Waterway's natural heritage: its scenic landscapes and waterscapes; its fish, wildlife, forest and plant resources; and its quality of air, land and water.
2. Preserve and realize additional benefits from the Waterway's cultural heritage: its significant history, its traditional economic and recreational bases, and its rural quality of life.
3. Identify and nurture new avenues for recreational and economic development compatible with the Waterway's natural and cultural values.
4. Establish priorities and a balance for growing demands on limited land and water resources along the Waterway, for the greatest long-term public benefit.

5. Strengthen government and public/private partnerships for effective planning and management to more equitably share the benefits and responsibilities of Waterway stewardship.

POLICIES AND IMPLEMENTATION

The natural resources of Calais include the St. Croix River, eight lakes, extensive wetlands greater than 10 acres in size, numerous streams and brooks, two small sand and gravel aquifers, extensive fisheries and wildlife resources, including seventeen bald eagle nesting sites, only a subset of which (4 in 2004) may be actively occupied in any given year. A significant portion of the Moosehorn Wildlife Refuge is located within Calais and provides important habitat for migratory birds and other wildlife species.

Calais' natural resources receive some protection. The Shoreland Zoning Ordinance, recently revised to meet State mandates, provides some protection to the State-identified wetlands, all eight of the lakes and many of the streams. The bald eagle nesting sites are protected by the federal Endangered Species Act and the Maine Endangered Species Act. The sand and gravel aquifers also may not be receiving adequate protection.

In order to protect and preserve the natural resources within the city of Calais, the city will continue to update local land use regulations to maintain consistency with the minimum State of Maine requirements. The city has developed the following policies and implementation strategies to further protect and preserve the natural resources:

Goal: Calais will protect and preserve the natural resources on which its economy and quality of life depend.			
Policy	Implementation Strategy	Responsibility	Timeframe
Water Quality and Water Resources			
Protect water quality.	Update Shoreland Zoning Regulations when necessary to maintain compliance with minimum State and Federal regulations and reflect the local needs of the community	Planning Board; City Council	On-going
	Continue to promote the use of Best Management Practices for Stormwater Management and for Erosion and Sedimentation Control through education of the Planning Board, Code Enforcement Officer and city road crews.	Planning Board; City Council	On-going
	Pursue extension of public sewer services (from their current terminus at Steamboat St.) a mile south along Route 1 to serve the campus where the Community College and High School are located.	City Council	Short-term (within 2 years)
Ensure that water quality is sufficient to provide for the protection and propagation of fish, shellfish, and wildlife and provide for recreation in and on the water	Establish a water quality-testing program for the City's lakes, streams, brooks and the St. Croix River. Give the highest priority to those water bodies most important for recreation and as fisheries and wildlife resources.	DEP Volunteer Program	On-going
	Amend the Subdivision Regulations to	Planning	2005

Goal: Calais will protect and preserve the natural resources on which its economy and quality of life depend.			
Policy	Implementation Strategy	Responsibility	Timeframe
	incorporate the DEP evaluation method (technical guide referenced in footnote 3) for phosphorous allocation in the city's lakes.	Board/ City Council	
	Encourage the further development of Lake Associations for Nashs, Keenes and Howard Lakes.	City Staff	On-going
	Encourage replacement of malfunctioning septic systems. Establish a recommended replacement and pumping schedule. Educate the public about the importance of maintaining and replacing on-site systems.	Code Enforcement Officer/DEP	On-going
	Continue dialogue and exchange of information on watershed planning issues with neighboring communities.	Planning Board/ WCCOG/Inter national Waterway Commission	On-going
Protect drinking water supplies.	Support efforts to replace piping to improve water quality within Calais.	City Council; Calais Water Department	On-going
	Assure adequate protection for groundwater resources that serve the City's public supply by developing and adopting a wellhead protection ordinance.	Planning Board/ City Council	2005
	Coordinate development of international bridge facilities so that design of drainage and substrate materials take wellhead protection measures into account, e.g. clay liners, drainage direction etc.	Planning Board	On-going
	Provide public water in areas of the city where risk of contamination is documented. Therefore, pursue extension of public water supplies (from their current terminus at Steamboat St.) a mile south along Route 1 to serve the campus where the Community College and High School are located.	City Council; Calais Water Department	Short-term (within 2 years)
	Make application, where eligible, to the Small Community Grant Program to upgrade any additional failing septic systems.	City Council	On-going
Land Suitability			
Ensure that development is located on land that is capable of supporting on-site water and septic systems in areas that are not served by centralized sewer and water services.	Continue to require a soil evaluation test prior to the issuance of a building permit in accordance with provisions in the Zoning and Subdivision Ordinances to require that developers demonstrate that soils are adequate for the intended purpose, that their projects will not be located on wetlands, on slopes of 20 percent or greater, or on floodplains.	Planning Board/City Council	On-going
	Direct development to areas with appropriate soils, slopes, and drainage conditions.	Planning Board	On-going
	Prevent/discourage development on floodplains and on steep slopes.	Planning Board	On-going

Goal: Calais will protect and preserve the natural resources on which its economy and quality of life depend.			
Policy	Implementation Strategy	Responsibility	Timeframe
Affirm, as a matter of public policy, that sewage treatment through the City's treatment facilities is preferred over subsurface sewage disposal	Continue to include provisions in the Subdivision and Land Use Ordinances to require that new residences and businesses shall be served by City utility district lines when these lines are reasonably accessible to the property line of a new development	Planning Board/City Council	On-going
Ensure that new development preserves, to the greatest extent possible, the natural and cover and vegetation.	Continue to require in the Zoning and Subdivision Ordinances that developers demonstrate that their projects will be compatible with the existing topography, and will preserve land cover and natural vegetation, to the greatest extent practical.	Planning Board/City Council	On-going
Floodplains			
Avoid problems associated with floodplain development and use along the City's Shorelands.	Continue to enforce the Shoreland Zoning Ordinance which prohibits residential, commercial and industrial structures in floodplains that are zoned Resource Protection.	Planning Board/City Council	On-going
	Continue to enforce the Floodplain Management Ordinance to discourage new residential, industrial, commercial and other significant development within 100 year floodplains.	Planning Board/City Council	Ongoing
Marine Resources			
Work to restore and maintain the water quality of the St. Croix River to allow for the broadest possible diversity of public and private users.	Encourage and support the upgrading of water treatment effluent and commercial/industrial effluent discharge quality with the goal of reclassification of the St. Croix receiving waters to allow for bodily contact.	City Council	On-going
	Continue to implement a water quality testing program to monitor storm water runoff and the River's overall health.	Wastewater Treatment Plant	On-going
	Identify areas along the coast which have high sediment erosion, and implement plans to reduce the erosion (i.e. bank stabilization, changes in land use or existing activities).	City Staff	On-going
	Encourage and support cooperation with State, Federal and International agencies/programs designed to improve the quality of the natural resources. Actively work through the St. Croix International Waterway Commission's programs. Seek Federal and State support for the Commission's activities.	City Staff/City Council	Ongoing
	Improve public information and education of the issues related to coastal management, and resource use. For example, involve local schools and Scouts in a "River Clean-up day" and sponsor "Maine Coastal Week" activities.	City Staff	On-going
Ensure that marine resources are not adversely affected by	Continue to require in Zoning Ordinance that prior to approval of non-residential marine developments, developer's document the impact	Planning Board/City Council	On-going

Goal: Calais will protect and preserve the natural resources on which its economy and quality of life depend.			
Policy	Implementation Strategy	Responsibility	Timeframe
future marine developments.	of the proposed project on the City's marine resources, and demonstrate that development effects will not be detrimental to those resources.		
Maintain and improve public access to the St. Croix River.	Continue to maintain the City's existing access facilities and implement the 2002 Waterfront Development Plan	City Council/ City Staff	On-going
	Continue to develop public access to the St. Croix River at clam flats between the narrows and Devil's Head.	City Council/ City Staff	On-going
Fish and Wildlife Habitat			
Protect existing fish and waterfowl/wading bird habitats within the town mapped as Essential Habitat or Significant Habitat.	Review protection provisions in the Zoning Ordinance and Subdivision Regulations to ensure early consultation with a Maine Department of Inland Fisheries and Wildlife Biologist when development is proposed in or near the site of Essential or Significant Habitats.	Planning Board	Short-term (within 2 years)
	Make use of the most recent data on rare plants, animals, and natural communities and important wildlife habitats provided by the Beginning with Habitat program of the Department of Inland Fisheries and Wildlife, included on maps in this document.	Planning Board	On-going
	Protect the high and moderate fisheries habitats in accordance with Shoreland Zoning regulations around these habitats. Consider increasing setback distances for large (>10 lots) new development proposals.	Planning Board	On-going
	Encourage landowners to protect and preserve wildlife habitat, and utilize conservation programs to preserve undeveloped land.	City Council/City Staff	On-going
	Appoint an advisory committee to develop a use and conservation plan for Devils Head area.	City Council	2005
Forest and Street Tree Resources			
Seek Tree City USA designation for Calais.	Obtain resources to conduct a street tree inventory and recommend maintenance of existing canopy and additional trees.	City Council; Maine Forest Service	Short-term (within 2 years)
Scenic Resources			
Identify and preserve important scenic resources.	Conduct Citywide inventory to identify highly valued scenic resources. Utilize the scenic inventory to be completed by the St. Croix International Waterway Commission.	Planning Board/ Waterway Commission	Long Term
Education and Traditional Use			
Traditional maritime uses and activities will be protected and promoted.	Review Shoreland Zoning Ordinance to ensure affirmative support for marine and commercial marine related activities.	Planning Board	Immediate
Ensure continued wise use of the Calais coast including fishing-related industries, recreational and recreational-related industries.	Assure that land use regulations (i.e. Zoning and Shoreland Zoning Ordinances) permit a variety of uses along Calais' coastline and allow adequate space for water dependent uses.	City Council/ City Staff	On-going

Goal: Calais will protect and preserve the natural resources on which its economy and quality of life depend.			
Policy	Implementation Strategy	Responsibility	Timeframe
Ensure that traditional use of lands and access to water are protected as development pressures increase.	Retain working waterfront as recreational pressures increase; develop facilities that serve both user groups; consider some separation of uses to ensure overall compatibility	City Council	Immediate (within two years)
	Identify areas in need of additional access.	City Council	Immediate
	Ensure there is adequate municipal mooring and anchoring areas and preserve areas best suited for moorings.	City Council	Immediate (within two years)
	Respect private property rights but seek to maintain traditional uses of any private roads or rights of way to the water. Negotiations with private land owners to secure these accesses will include: <ul style="list-style-type: none"> • Acknowledgement/celebration of landowners who continue the centuries old practice of allowing public use of their lands; • Informal agreements allowing public use of lands; • More formal agreements allowing public use of lands until and unless problems arise from disrespectful use of private land (eg. Leaving gates open, littering, vandalism); • Providing property tax incentives to property owners who grant written, revocable rights of access across their property; • Purchasing rights of first refusal for access points or property of critical importance to the fishery; • Purchasing permanent easements or fee title to access points or property of critical importance to the fishery. 	City Council; Planning Board	Immediate (within 2 years)
Utilize financial incentive programs	Encourage landowners to participate in farm, open space and tree growth programs.	City Council CEO Planning Board	On-going

SUMMARY

Calais currently offers protection to its natural resources with locally adopted shoreland zoning regulations, zoning and subdivision regulations. These ordinances were substantially re-written to implement policies developed in the 1992 Comprehensive Plan. They are and will be updated to be consistent with the requirements of state and federal regulations and to ensure that Calais retains its character as a maritime city. Protecting public shore and water access and maintaining a healthy balance between industry and natural beauty is crucial for future economic development. Investments will be made in infrastructure that increases access to and use of the city's waterfront. Water quality will be protected and improved through the continued educational, research and regulatory efforts of the city and local resource management agencies.